

REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

Independent claim 1 has been amended to include the limitations of claims 2 and 4. Independent claim 10 has been amended to include the limitations of claim 11. The dependent claims have been amended to correct dependencies and make them consistent with amended claims 1 and 10. Finally claim 19 has been canceled because it is identical to amended claim 10.

In the Advisory Action, the Examiner indicates that the Applicant did not argue the limitations added to claims 1 and 10. This statement is not understood. The basis for the following arguments is that the Davis patent does not disclose the a body with leads, *inside* of which is positioned a light emitting diode, control element, optical element, *and* sensor. The body with leads of Davis only includes the control element and sensor, and not the LED or optical element.

As stated in the previous unentered response, the rejection of claims 1-19 under 35 USC §102(b) in view of U.S. Patent Publication No. 2003/0034959 (Davis) is respectfully traversed on the grounds that the Davis publication fails to disclose or suggest an optical mouse having **an LED, control element, optical element, and sensor** all integrated into a module made up of a single "body" with at least one contact tine extending therefrom, the LED, control element, optical element, and sensor being "*received*" or "*mounted*" in a predetermined space "*defined in the body,*" as claimed. Whereas the claimed invention permits the LED, control element, optical element, and sensor to be installed on a circuit board in a mouse handling in a single step of plugging the tine(s) extending from the body into the circuit board, Davis requires separate installation of the lens assembly 38, sensor chip 16/84, and LED 34, which are all independently positioned on the circuit board, the LED 34 being spaced from the body 16 and not even remotely mounted therein, as claimed. **This is true of both Fig. 2 and Fig. 4 of the Davis patent.**

In the Advisory Action, the Examiner indicates that Fig. 4 of the Davis patent was not adequately addressed. Therefore, **additional comments** concerning **Fig. 4 of the Davis patent** are included below, although it is respectfully noted that Fig. 4 is merely a schematic depiction of elements whose structure is depicted in Fig. 3 of the Davis patent, and that even in the schematic depiction, the optical element is clearly depicted as separate from the IC that includes the leads.

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Fig 4 is
a different
embodiment

As pointed out in the previous unentered response, the Examiner argues in the "Response to Arguments" section of the final Office Action, item 4 on page 4, that:

*Specifically, Davis teaches in figure 2 a sensor chip body 16 having pins securely provided inside the space and extending from the **body of the sensor chip 16** (see figure 2 at 16). Within, this sensor chip 16, Davis teaches how his optical mouse comprises an LED 34 and a sensor in the form of a photodetector array 84 integrated into a module made up of a single "**body**" 16 with at least one contact tine extending therefrom (see figure 2), the LED 34 and sensor 84 being "received" or "mounted" in a predetermined space "defined in the body 84" (see figures 2 & 4).*

Even when Figs. 3 and 4 of the Davis patent are considered in detail, this justification for the rejection still contains at least two errors:

- First, the explanation of the rejection does not address the inclusion of the optical element in the body. The Examiner will note that original claim 19, as well as several original dependent claims, specifically recited the combination of the LED, sensor, optical element, and control element within the body. The corresponding optical element of Davis is lens assembly 38, which is clearly depicted in Fig. 3 of the Davis publication as being situated below the body of chip 16, is also depicted in Fig. 4 of the Davis publication as a separate element (as is the prism 38D and LED 34).
- Second, LED 34 cannot reasonably be considered to be received or mounted in a space within body 16 from which tines extend. As is clear from Fig. 3 of the Davis publication, chip 16 in which sensor 84 is located, is spaced from the LED 34, and in fact is separated therefrom by two reflectors 38D. Fig. 4 does not negate the LED spacing shown in

Fig. 3, but rather merely shows that the IC (solid line) includes image processor 80 and photodetector array 84.

The Applicant does not dispute that Davis shows an IC with a photodetector array, as depicted in Figs. 3 and 4. However, Davis does not disclose inclusion of the lens, prism, and LED in the chip body so that the photodetector array, lens, prism, and LED can all be plugged in as a single unit. **Fig. 4 is merely a schematic depiction of the circuitry included in the IC. At best, it indicates that the LED is part of a "package," with the lens and prism clearly and explicitly depicted as completely separate elements.**

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fig. 4 is another
embodiment

Even if Fig. 4 of Davis is interpreted as suggesting physical incorporation of the LED 34 in a "body" of the type claimed, Davis clearly does not disclose or suggest inclusion of the lens and prism. Instead, Davis teaches a separate lens assembly that includes a base 38A, a lens holder 38B to hold the lens 38C, and the prism 38D, *which are all set apart from the optical sensor chip 16 and LED 34* and positioned at a preset position in the base plate 40. In order to assemble the sensor of Davis, it is necessary to align lens holder 38, lens 38C, prism 38D, recess 40A, hole 40B, alignment post 40C, and clip 32. In particular, in Davis:

Red-herring
b/c claims
stipulate
"at least 1
optical elmt"
LED fulfills this
aspect.

- LED 34 and optical sensor chip 16 (whether or not considered to be a single package as indicated in Fig. 4) must be set separately on PCB 36 and aligned so that the photodetector array 84 aligns with the hole 36A;
- the base 38A of the lens assembly 38 must be set in the recess 40A; and
- the circuit board 36 aligned with the base 40 via post 40C and hole 36D so that the lens holder 38B and prism 38D extend through the opening 36A.

In contrast, the claimed invention simply requires that body 2 be aligned with the circuit board so that pins 23 can be inserted into corresponding holes

According to the claimed invention, the LED and sensor, as well as an optical element and control unit are all received or mounted "inside the space defined inside the single body," with the at least one contact tine extending from the body. This arrangement permits all of the principle components of the sensing module, including the LED, sensor, control unit, and optical

element, to plugged *as a unit* into a circuit board. This result in substantial savings in assembly time and inventory costs, since Davis requires separate handling and installation of the sensor chip 16, the optical element 38, and the LED 34. Therefore, not only does the Davis patent fail to anticipate the claimed invention, it could not possibly have suggested such integration, by the claimed invention, of all of the optical and control elements required to manufacture an optical mouse. Furthermore, the claimed integration enables substantial miniaturization relative to the separately positioned sensor chip body 16, LED 34, and optical element 38 of Davis, and greatly reduces the possibility of mis-alignment of the various elements.

Thus, the claimed invention not only results in significant cost saving due to reduction in the number of parts; elimination of LED bending, assembly, and alignment steps, and elimination of the clip assembly step, but the claimed invention also offers substantial performance improvement due to reduced possibility of misalignment. **Attachment 1** shows a **Gen 1** (Generation 1) sensor arrangement corresponding to the Davis arrangement, with a separately mounted control circuit/sensor array, lens, prism, and LED, and as **Gen 2** (Generation 2) sensor arrangement corresponding to the claimed arrangement with a control circuit, sensor array, and integrated lens, prism, and LED. Page 1 includes side-by-side views of the actual packages, page 2 shows interior components including the lens and body, page 3 shows stray light emitted by the respective packages, page 3 shows light projected by the lens for the same power LED (note the significant increase in brightness at the focal point of the lens), and page 4 shows the resulting light convergence from the pris for the same power LED. Pages 1-4 of Attachment 2 show the lower power dissipation provided by the claimed integrated arrangement (Gen. 2) in contrast to the conventional arrangement of Davis (Gen. 1). Finally, Attachment 3 summarizes the production advantages of the claimed arrangement over the conventional arrangement.

The schematic depiction of the circuitry in **Fig. 4** of the Davis patent does not change the teachings included in **Fig. 3** of the Davis publication, which clearly shows that the LED 34 and sensor 16 are **separate** units mounted on a circuit board, and not received within a space defined

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in the sensor chip body 16. Even if the sensor 16 could be said to be received or mounted in a space “defined in a body” from which a contact tine extends, as claimed, the sensor 16 and LED 34 cannot reasonably be interpreted as being received in the same space within the same body to form a sensor module corresponding to that of the claimed invention. Instead, the sensor 16 and LED 34 of Davis (as well as the optical element 38) must be inventoried separately, and assembled separately to the circuit board 36 for mounting in the mouse housing. **Only the control unit and sensor of Davis are integrated into chip 16. The LED and optical element are not.** The mouse housing of Davis, in which the LED and sensor chip 16 are both received, cannot reasonably be interpreted as corresponding to the claimed body since the mouse housing does not include a tine extending therefrom, as claimed. As a result, the Davis publication neither discloses nor suggests the integration principle of the claimed invention.

Because the Davis publication fails to disclose or suggest the claimed “body” having a contact tine extending therefrom and a space within the body, the LED, sensor, control unit, and optical element all being received in the space within the body, it is respectfully submitted that the rejection of claims 1-19 under 35 USC §102(b) is improper and withdrawal of the rejection is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,
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